

CLAIMS

I/We claim:

- [c1] 1. An aircraft, comprising:
a fuselage;
a wing depending from the fuselage;
a device that is movable relative to at least one of the fuselage and the wing;
an actuator housing having a receptacle portion coupled to at least one of the wing and the fuselage, the receptacle portion including at least one receptacle having a receptacle surface with a first registration feature;
an actuator releasably disposed in the receptacle, the actuator being positioned adjacent to the receptacle surface and having a second registration feature engaged with the first registration feature; and
an actuator linkage coupled between the actuator and the device.
- [c2] 2. The aircraft of claim 1 wherein the receptacle portion includes an opening through which the actuator linkage passes.
- [c3] 3. The aircraft of claim 1 wherein the receptacle portion includes a first opening through which the actuator linkage passes, and a second opening through which an electrical cable of the actuator passes.
- [c4] 4. The aircraft of claim 1, further comprising a cover removably coupled to the actuator housing.
- [c5] 5. The aircraft of claim 1 wherein the wing includes a lower surface and an upper surface facing opposite from the lower surface, and wherein the actuator

housing is integrally attached to the lower surface, the actuator being accessible through a downwardly facing aperture in the receptacle portion, further wherein the device includes a trailing edge device, still further wherein the actuator linkage is coupled between the actuator and the trailing edge device.

[c6] 6. The aircraft of claim 1 wherein the receptacle surface includes a resilient, flexible, conformal surface, and wherein the first registration feature includes a protrusion extending from the receptacle surface, further wherein the second registration feature includes a recess in a surface of the actuator, the protrusion of the receptacle surface being positioned to be received in the recess of the actuator.

[c7] 7. The aircraft of claim 1 wherein the receptacle surface is one of at least two opposing receptacle surfaces, each receptacle surface being resilient, flexible and conformal to force the actuator to a predetermined position relative to at least one of the wing and the fuselage.

[c8] 8. An aircraft, comprising:
a fuselage;
a wing depending from the fuselage;
a component housing integrally attached to at least one of the wing and the fuselage, the component housing having at least one flexible, resilient receptacle surface positioned adjacent to a receptacle, the at least one receptacle surface having a first registration feature;
and
an aircraft component releasably disposed in the receptacle, the aircraft being positioned adjacent to the receptacle surface and having a second registration feature engaged with the first registration feature.

- [c9] 9. The aircraft of claim 8 wherein the aircraft component includes an aircraft actuator coupled to a movable device carried by at least one of the wing and the fuselage.
- [c10] 10. The aircraft of claim 8 wherein the wing includes a trailing edge device and wherein the aircraft component includes an aircraft actuator coupled to the trailing edge device with an actuator link.
- [c11] 11. The aircraft of claim 8 wherein the housing includes a plurality of flexible, resilient receptacle surfaces positioned to exert a compressive force on the aircraft component.
- [c12] 12. The aircraft of claim 8 wherein the wing includes a lower surface, an upper surface facing opposite from the lower surface, and a trailing edge device, and wherein the component housing is integrally attached to the lower surface, and wherein the component includes an actuator that is accessible through a downwardly facing aperture of the receptacle, the actuator being coupled to the trailing edge device with an actuator linkage.
- [c13] 13. The aircraft of claim 8 wherein the first registration feature includes a protrusion extending from the at least one receptacle surface, and wherein the second registration feature includes a recess in a surface of the aircraft component, the protrusion of the at least one receptacle surface being positioned to be received in the recess of the aircraft component.
- [c14] 14. An unmanned aircraft, comprising:
 a fuselage;
 a wing depending from the fuselage;
 a flight control surface that is movable relative to the wing;

an actuator housing having a receptacle portion integrally coupled to the wing, the receptacle portion including at least one receptacle having at least one receptacle surface formed from a resilient, conformal material, the at least one receptacle surface having a projection;
an actuator releasably disposed in the receptacle, the actuator having at least one recess into which the projection is releasably received, the actuator being under a compressive force exerted by the at least one receptacle wall; and
an actuator linkage coupled between the actuator and the flight control surface.

[c15] 15. The aircraft of claim 14 wherein the actuator includes an electric actuator and wherein the receptacle portion includes a first opening through which the actuator linkage passes, and a second opening through which an electrical cable of the actuator passes.

[c16] 16. An apparatus for releasably carrying an aircraft actuator, the aircraft actuator having an actuator registration feature, the apparatus comprising:

a housing that includes:

a plurality of receptacle surfaces positioned around a receptacle, the receptacle having an opening positioned to receive the aircraft actuator, at least one of the receptacle surfaces being formed from a conformable material to flex between a first position when the aircraft actuator is positioned in the receptacle and a second a second position when the aircraft actuator is removed from the receptacle, at least one of the receptacle walls having a receptacle registration feature positioned to engage with the actuator registration feature when the actuator is received in the receptacle; and

a cover removably secured to at least one of the receptacle walls to cover the opening.

[c17] 17. The apparatus of claim 16 wherein the actuator registration feature includes a projection and wherein the receptacle registration feature includes a recess into which the projection is releasably received.

[c18] 18. The apparatus of claim 16, further comprising the actuator.

[c19] 19. The apparatus of claim 16, further comprising the actuator, and wherein the actuator includes an electric actuator coupled to a linkage to move an aircraft trailing edge device.

[c20] 20. An unmanned aircraft, comprising:
a fuselage;
a wing having a spanwise portion extending away from the fuselage in a first direction and a winglet extending away from the spanwise portion in a second direction transverse to the first direction, the winglet having an access aperture;
a component housing removably received in the winglet through the access aperture; and
at least one aircraft component releasably carried by the component housing and removable from the winglet as a unit with the component housing.

[c21] 21. The aircraft of claim 20 wherein the access aperture of the winglet faces generally downwardly when the aircraft is in level flight.

[c22] 22. The aircraft of claim 20 wherein the at least one aircraft component includes an antenna.

[c23] 23. The aircraft of claim 20 wherein the component housing includes a plurality of flexible, resilient receptacle walls positioned around a receptacle, and wherein the at least one aircraft component is releasably received in the receptacle.

[c24] 24. The aircraft of claim 20 wherein the at least one aircraft component includes:

- a receiver antenna;
- a receiver module operatively coupled to the receiver antenna to receive signals from the receiver antenna;
- a transmitter antenna; and
- a transmitter module operatively coupled to the transmitter antenna to transmit signals to the transmitter antenna.

[c25] 25. An unmanned aircraft, comprising:

- a fuselage;
- a wing depending from the fuselage;
- a device that is movable relative to at least one of the fuselage and the wing;
- actuator housing means for releasably carrying an actuator, the actuator housing means having a receptacle portion with a first registration feature;
- an actuator releasably disposed in the receptacle, the actuator being positioned adjacent to the receptacle wall and having a second registration feature engaged with the first registration feature; and
- an actuator linkage coupled between the actuator and the component.

[c26] 26. The aircraft of claim 25 wherein the receptacle portion includes an opening through which the actuator linkage passes.

[c27] 27. The aircraft of claim 25 wherein the receptacle portion includes a first opening through which the actuator linkage passes, and a second opening through which an electrical cable of the actuator passes.

[c28] 28. The aircraft of claim 25, further comprising cover means removably coupled to the actuator housing means.

[c29] 29. The aircraft of claim 25 wherein the wing includes a lower surface and an upper surface facing opposite from the lower surface, and wherein the actuator housing means are integrally attached to the lower surface, the actuator being accessible through a downwardly facing aperture in the receptacle portion, further wherein the component includes a trailing edge device, still further wherein the actuator linkage is coupled between the actuator and the trailing edge device.

[c30] 30. The aircraft of claim 25 wherein the receptacle surface includes a resilient, flexible, conformal surface, and wherein the first registration feature includes a protrusion extending from the receptacle surface, further wherein the second registration feature includes a recess in a surface of the actuator, the protrusion of the receptacle surface being positioned to be received in the recess of the actuator.

[c31] 31. The aircraft of claim 25 wherein the receptacle surface is one of at least two opposing receptacle surfaces, each receptacle surface being resilient, flexible and conformal to force the actuator to a predetermined position relative to at least one of the wing and the fuselage.

[c32] 32. A method for replacing an actuator in an aircraft, comprising:
 accessing an actuator housing positioned in at least one of a wing and a fuselage of the aircraft;

accessing a first actuator positioned in a receptacle portion of the actuator housing;
disengaging a first registration feature of the actuator housing and a second registration of the first actuator;
removing the first actuator from the actuator housing and the aircraft; and
replacing the first actuator with a second actuator by placing the second actuator in the receptacle of the actuator housing, with a second registration feature of the second actuator engaged with the first registration feature of the of the actuator housing.

[c33] 33. The method of claim 32 wherein disengaging a first registration feature and a second registration feature includes disengaging a projection of the actuator housing from a recess of the actuator.

[c34] 34. The method of claim 32, further comprising flexing at least one flexible, resilient surface of the actuator housing when removing the first actuator and replacing the first actuator with a second actuator.

[c35] 35. The method of claim 32 wherein:
removing the first actuator includes removing an electrical lead of the first actuator through a first opening in a surface of the receptacle portion, and removing an actuator link through a second opening in a surface of the receptacle portion, and wherein
removing the first actuator with a second actuator includes passing an electrical lead of the second actuator through the first opening, and passing an actuator link of the second actuator through the second opening.

[c36] 36. The method of claim 32 wherein replacing the first actuator with a second actuator includes replacing a first electrically operated actuator coupled to

a trailing edge device of the aircraft with a second electrically operated actuator, and coupling the second electrically operated actuator to the trailing edge device.

[c37] 37. The method of claim 32 wherein accessing a first actuator includes accessing a first actuator having a first position relative to the aircraft, and wherein replacing the first actuator with a second actuator includes placing the second actuator in a second position relative to the aircraft, the second position being at least approximately identical to the first position.